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ABSTRACT

This study developed and tested an educational game used in teaching health care concepts to preschool children. It was hypothesized that exposure to the game, which was called "Hospital Windows," would increase children's knowledge of health care equipment and procedures and decrease their fears of health care. Subjects, who were randomly selected, were healthy preschool children enrolled in public and church-affiliated preschools and day care programs in a large midwestern city. A total of 101 children between 4 and 6 years of age participated in the study. Of these, 28 were assigned to a control group. Results of a paired t-test indicated a significant increase in the children's knowledge of health care concepts and a significant decrease in fear of medical equipment and procedures after children played the Hospital Windows game. It is concluded that the use of game playing appears to be an effective method of teaching health education to young children in the classroom. (RH)

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GAME PLAYING: A METHOD FOR REDUCING YOUNG CHILDREN'S FEAR OF MEDICAL PROCEDURES

Abbreviated Title: Reducing Young Children's Fear

by

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Abstract

Little research has been conducted on the effectiveness of age-appropriate health teaching aids for use in the classroom setting. This experimental study measured the effectiveness of "Hospital Windows", a medically orientated, education game for it's ability to increase knowledge and decrease fears of young children regarding common health care practices and procedures. A random selection of 101 healthy preschool children, between the ages of 4 and 6 years, participated in the study. Results of a paired t-test indicated a significant increase in the experimental children's knowledge of health care concepts and significant decrease in fear of medical equipment and procedures after playing the game. The use of game playing appears to be an effective instructional method of teaching health education to young children in the classroom setting.

Game Playing: A Method for Reducing

Young Children's Fear of Medical Procedures

Over the last fifty years much has been written regarding the psychological reactions of children to health care settings (Beverly, 1936, Klinzing & Klinzing, 1977; Longford, 1948; Prugh, Staub & Sands, 1953; Thompson & Stanford, 1981; Vernon, Foley, Sipowicz & Schulman, 1965). In helping children adjust to an impending medical related situation, health care professionals have emphasized the importance of preparation for hospitalization, surgery, diagnostic testing, and separation from home and family (Ferguson, 1979; Schreier & Kaplan, 1983). Studies have found that many children are more cooperative during a medical procedure; tend to show less anxiety, adjust better during hospitalization if they have been provided with age-appropriate explanations (Chan, 1980; Rie, Bovermann, Grossman, & Ozoa, 1968).

The beginning of systematic research of psychological preparation methods for children in hospitals began in the late 1940's and early 1950's (Davidson, 1949; Blom, 1957). Such research efforts continued through the 1960's and 1970's with additional programs being developed for **well-children** preparing them for future health care experiences (Abbot, Hansen & Lewis, 1970; Chan, 1976; Sauer, 1968).

Many of these programs for **well-children** were group presentations conducted in a health care setting (Schrader, 1977; Stainton, 1974; Tucker, 1963; West, 1976). However, these programs had several drawbacks in that young children could not be completely protected from unexpected sights and sounds in the hospital setting; programs were often conducted by untrained volunteers instead of hospital personnel; and there was little or no follow-up once the children return to the classroom setting. Because of

the problems that emerged in conducting non-patient preparation programs health care professionals began expressing their opinions regarding the correct methods and appropriate program structure needed for educating healthy children. Azarnoff (1983) identified three specific educational strategies frequently used in preparing healthy children for health care experiences: (a) parent education at home, (b) hospital based tour and orientation programs, and (c) health units incorporated into class room curriculums.

Preparation Programs for Well-Children

Parent Education. Parents of young children are in a unique position to know their children's previous life experiences, anxieties, fears and their methods of communicating. However, the majority of parents participating in a parent education program (Brazelton, 1984) admitted that they could not discuss the information provided by the hospital with their children because of their own anxieties and fears. As difficult as the task may have been, Brazelton concluded that when children are prepared by their own parents they are not as frightened or as withdrawn. These same children are found to eat, sleep and recover better while in the hospital and after returning home.

Hospital Based Programs. Mather and Glasrud's (1981) survey of 152 U.S. hospitals showed that more than 60% conducted well-children orientation programs and tours. Less than 50% conducted community outreach, educational programs in the school systems. In a similar survey conducted by individuals at Pediatric Projects, Inc., Santa Monica, California, 12 hospitals dropped their community outreach, educational programs because of lack of staff and time; lack of financial resources; the school groups were too large to accommodate the hospital facilities; a concern for children's reactions for information presented; and the

inability to monitor and follow up sufficiently after the children have returned to the classroom setting. This has led many education and health professionals to believe that hospitals and hospital personnel may not be the appropriate places or people to foster positive learning experiences with young children.

School Health Education Programs. The American Academy of Pediatrics Committee on Infant and Preschool Children along with Head Start programs (1973) recognized the importance of health education for the preschool-age child. It was identified that health education was lacking because preschool-age children had been kept at home prior to this time and were not considered accessible as a group. However, this is becoming less of a problem as more and more preschoolers are in day care (Waldman, 1979).

A second factor identified as a problem to providing health education was the delivery of the health education materials and information. A simple adaptation of the elementary level health education materials to the preschool level was found to be completely inadequate (McCormic, 1976). When a curricula was available and considered appropriate the adult responsible for teaching the health unit had little or no instruction on teaching such a unit. This lack of experience was found even among teachers with preparation in early childhood education (Richards, 1975).

Available Educational Materials. Many of the available educational materials were developed by hospitals specifically for use in their patient education programs. Examples of these materials include: brochures, coloring books, video tapes, and informational booklets. The goal of these materials is to facilitate stress-reduction in hospitalized children with information and activities about general hospital procedures and health conditions. The literature does not provide information to support the use of these materials in the classroom settings or to augment an outreach,

educational program presented by hospital personnel. Also, it is not evident which medically oriented toys presently available have the most applicability and utility with children at different ages and stages of development. There is a real need for well-designed research studies conducted on the usefulness of medically oriented toys (Ferguson, 1986).

Besides hospital prepared materials there are commercially manufactured, medically oriented materials available for preparing healthy children in the classroom setting. A variety of medical resource kits are available for purchase from the Association for the Care of Childrens Health in Washington, D. C. The cost of the kits range from $9.00 to $55.00 and include such items as an x-ray, surgical hats and masks, bandaids, casting materials and a stethoscope. Three kits have been developed primarily for use by parents and teachers. There is, however, no structured format or lesson plan included in such kits.

Purposes

The importance of preparing children and their families for possible health care experiences has been well documented. The Association for the Care of Childrens Health (1980) recommends that children and families in the community be provided with opportunities to learn about health care facilities and practices before they are faced with the need to use them. The purpose of this study, therefore, was to develop and test a medically oriented, educational game which can be used as an instructional tool in the classroom setting to teach health care concepts to preschool children.

Hypothesis

It was hypothesized that exposure to a medically oriented, educational game would (a) increase children's knowledge of health care equipment and procedures, as measured by the Medical Equipment Knowledge Inventory, and (b) decrease children's fears of health care, as measured by the

Facial-Expression Fear Scale and the Touch Response Assessment.

Methods

Subjects

Subjects participating in this study were healthy preschool children enrolled in public and church affiliated preschools and day care programs in a large midwestern city. The sample of the preschools represented a cross-section of all socioeconomic levels. A total of 101 children, 46 males and 55 females, between the ages of 4 and 6 years participated in the study. A control group of 28 children was also randomly selected from the preschools. Seventy-three children composed the experimental group and 28 children were in the control group. The preschools and day care centers were selected from a list of facilities scheduled to attend a local hospital pediatric orientation program. Letters were sent to the directors describing the study and then contracted by phone to confirm their participation. Children were randomly selected from enrollment lists. The preschool directors and teachers distributed and obtained signatures on all consent forms.

Instruments

The "Hospital Windows" game. Prior to the game's development an informal survey was conducted with preschool, kindergarten and first grade children. The children were all asked to draw pictures in response to these questions, "Why do people go to the hospital?", "What do you think happens at the hospital?". From the pictures returned, 85% were of a large building with several windows and human faces in the windows. This information provided the basic concept for the game.

Children playing the game learned about the hospital by matching photographs and filling in the squares on a a gameboard. The game consists of 24 large (14" x 14") black and white photographs, referred to as Teacher

Cards, and 5 gameboards (14" x 17"). On one side of each Teacher Card is a picture of a child and a health care professional interacting in a medical situation with a piece of medical equipment. Information on the back of each Teacher Card includes: vocabulary words, an explanation of the medical procedure, and a series of questions the teacher may use for class discussion. Each gameboard consists of 25 smaller removable squares. Behind each square is a black and white photo matching one of photos on a Teacher Cards.

The adult leading the game displays one of the Teachers Cards and uses the information on the back to lead the children in a discussion. The children then cover the square on their gameboard that matches the Teacher Card photo. The object of the game is to fill in a row on the gameboard much like bingo. As more squares are covered on the gameboard a color picture of the outside of a hospital begins to appear.

The Medical Equipment Knowledge Inventory. The inventory developed by the authors assessed children's understanding of medical instruments and equipment by asking them to describe the piece of equipment, its purpose and/or function; and by whom it is used. The specific questions used were "What is this?", "Who uses it?", "How does it work?". Incomplete responses were further probed with cues such as, "Can you think of anything else?", or "Can you explain what you mean?" The nine pieces of medical equipment used were a stethescope, blood pressure cuff, bandaid, syringe, medical chart, I.D. bracelet, anesthesia mask, paper mask and an otoscope. Each of the nine items were described in the Hospital Windows game.

A child's knowledge score on each of the nine items ranged from zero to three. A score of zero was given when a child's response was totally incorrect. A score of one was given when the child gave one correct statement of information about the piece of medical equipment. A score of

two was given when the child gave to to three correct statements of information about the piece of medical equipment. A score of three was given if the child gave four or more correct statements of information. The total points possible on the Medical Equipment Knowledge Inventory ranged from 0 to 27.

The Facial-Expression Fear Scale. The scale was developed by the authors after a close review of the literature and based upon experience with children in health care settings. The Facial-Expression Fear Scale is a 5-point Likert scale composed of simple black on white line drawings of faces representing five different degrees of fear. The first face was depicted with a smile representing "happy, not scared at all." The last face has raised eyebrows and a round mouth representing "very, very scared." The Facial-Expression Fear Scale was mounted on a piece of cardboard. Each of the five facial expressions were explained to the children prior to the initial testing session beginning. During the pretest and posttesting sessions as the children pointed to a face which accurately told the adult how they felt about the piece of medical equipment presented, their response was checked off on a scoring form.

Previous studies suggested that preschool children were able to understand and utilize a 5-point Likert scale to indicate fear of medical situations (Katz, 1980; Melamed, et al., 1976; Siaw, et al., 1986; Thompson, 1985).

The Touch Response Assessment. A second measure of anxiety and fear was developed by the authors after some initial data collection. It appeared that some of the children were touching or actually using the piece of medical equipment in their explanation more often during the posttest than the pretest. To reliably measure when the child touched or handled the equipment, the Touch Response Assessment was developed and

implemented into the testing process. A child received a score of zero if no effort was made to touch the piece of medical equipment show. A score of one was given when the child touched some part of the medical equipment. A score of two was given when the child handled the piece of medical equipment in an appropriate way in his/her explanation. The scoring for the Touch Response Assessment took place during the pretest and posttest sessions in conjunction with the Medical Equipment Knowledge Inventory and the Facial-Expression Fear Scale.

Procedure

This study was a pretest and posttest, control group design. Prior to playing the game, a group of four to six experimental group children were individually pre-tested on medical knowledge and fear of medical procedures by two child life specialists. The same group of children then played the "Hospital Windows" game. Immediately following the game, each child was again tested using the three scales. The control children were pretested in the same way. However, after the prestest, instead of playing Hospital Windows, the control children played a game matching colors on a bingo type gameboard. This game was very similar in structure and playing style to Hospital Windows and took about the same length of time to complete.

Inter-rater reliability between the two coders was calculated using this formula: reliability equals the number of agreements between the two observers divided by the number of agreements plus disagreements (c.f. Adams & Schvaneveldt, 1985). Reliability percentages for pretest and posttest data for all three measures were: Medical Equipment Knowledge Inventory pretest 95%, posttest 98%; Touch Response Assessment pretest 90%, posttest 94%; Facial-Expression Fear Scale pretest 100%, posttest 100%.

Results

There were no significant differences between the experimental and

control groups on any of the three pretest measures, therefore the groups were assumed to be equivalent.

It was hypothesized that healthy preschool children's exposure to a medically oriented, educational game, "Hospital Windows" would increase their knowledge of medical equipment and procedures, as measured by the Medical Equipment Knowledge Inventory. Results of a paired (correlated) t-test showed that the experimental children made a significant increase in medical knowledge from pretest (M=14.3) to posttest (M=19.3), $t(72) = 11.0$, $p<.001$. No such gain was made by the control group, pretest M=15.4, posttest M=15.7.

It was further hypothesized that healthy preschool children would decrease their fear of medical equipment after exposure to the "Hospital Windows" game. A paired t-test was again used and showed that experimental children's fears, as measured by the Facial-Expression Fear scale significantly decreased from pretest (M=23.4) to posttest (M=21.8), $t(72)=2.74$, $p<.004$. There was no significant decrease in fear for the control group (pretest M=25.4, posttest M=25.5.

The children also showed a decrease in their fear of medical equipment and procedures as measured by the Touch Response Assessment. The experimental children showed a significant increase in the handling of medical equipment from pretest (M=3.9) to posttest (M=7.3), $t(40)=-4.8$, $p<.001$. The control group, however, also showed a significant increase from pretest (M= 5.1) to posttest (M=9.4), $t(28)=-3.06$, $p<.005$.

Differences in the responsiveness to the "Hospital Windows" game between males and females, or between those children with or without prior hospital experiences, were not predicted. However, to assess possible gender and hospitalization effects a 2 (gender: boys, girls) by 2 (hospitalization experience: yes, no) analysis of variance was done on the

children's gain scores on the Facial-Expression Fear Scale and the Touch Response Assessment, and on the Medical Equipment Knowledge Inventory. The gain scores were defined as the differences in pretest and posttest scores for each of the measures. No interaction effects were found, and the gender or hospital main effects were not significant.

DISCUSSION

Several interesting implications can be derived from this study. First, game playing may be an especially effective way in dealing with some child fears and anxieties. Games are generally enjoyable and nonthreatening to children, games are adaptive to different developmental levels, and games are usually played in a social context with playmates who often model appropriate attitudes and behaviors (Mather, 1984; Roberts, et al., 1981).

Secondly, it is interesting to note that although the control group demonstrated no increase in medical knowledge, or a decrease in fear as measured by the Facial-Expression Scale, these children did increase their touching and handling of the medical equipment. It seems reasonable to assume that the amount of handling, by picking up and manipulating the medical syringe for example, is related to the child's level of fear and anxiety for that object. The repeated exposure to the equipment—each child saw each piece of equipment four times by the end of the posttest—sufficiently desensitized the child to the objects to a measurable degree. Professionals working with children in medical settings might study how even a brief intervention of this sort, by quickly showing and explaining the medical procedure, may have therapeutic benefit for young children.

The touch measurement itself may be valuable to child researchers in that it is an example of a nonverbal measurement procedure. Physical

gestures and body language may provide accurate and reliable information about children's feelings that are often overlooked in the evaluation and assessment of young children's feelings. Broome (1986) has suggested that researchers should employ multiple measures for studying feeling constructs (including behavorial measures) to validate children's verbal self-reports.

Despite the efforts of medical facilities and some parents, many children are unprepared for the trauma of hospitalization, thus schools may be an additional resource to ready children for medical treatment. Teacher resources for this purpose are limited, however, and a medically oriented, educational game, like "Hospital Windows" may be an effective tool to facilitate children's preparation for hospitalization. For some children, this form of preparation may be the only experience encountered prior to a medical emergency.

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